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Google Glass in Nursing Education: Can Baccalaureate Nursing Students
Use Wearable Technology to Access Knowledge at the Point of Care?

Systems Change Project
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Doctor of Nursing Practice

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ABSTRACT

Technology use is ubiquitous in nursing, therefore it is vitally important that pre-licensure nurses have opportunities to develop nursing informatics skills and abilities that prepare them to practice in an ever-changing environment filled with technology. This quantitative, qualitative, interpretive, descriptive pilot study takes an established teaching method (simulation) and evaluates how baccalaureate nursing students can use an emerging disruptive technology (EDT) to impact decisions at the point of care. Eleven (100%) of the participants successfully completed two tasks using Google Glass, (GG): (a) they accessed data at the point of care; (b) completed a Situation Background Assessment Response (SBAR) report to a remote provider hands free. Two themes about using GG focused on communication and safety. This pilot indicates that using EDT in pre-licensure nursing education may be an effective way to narrow the education practice gap in nursing informatics, especially as it applies to nurse as knowledge worker.

Google Glass in Nursing Education: Can Baccalaureate Nursing Students Use Wearable Technology to Access Knowledge at the Point of Care?

BACKGROUND

Technology use is ubiquitous in both the private and professional lives of baccalaureate nursing students and will continue to play a significant role in their future professional practice. The permeation of technology into all levels of nursing requires educators to evaluate how teaching with and about technology prepares entry level nurses to integrate technology at the point of care delivery. There remains an education practice gap in nursing which yawns especially wide at the nursing informatics juncture (Goncalves, Wolff, Staggers, & Peres, 2012; Secco, Doiron-Maillet, Amirault, & Furlong, 2013). Nursing Informatics is defined by the American Nurses Association (2008) as the integration of nursing science, computer and information science, and cognitive science to manage communication and expand the data, information, knowledge and wisdom of nursing practice. Nursing informatics requires the nurse to weave together three different ideologies to manage communication and expand the knowledge and wisdom of the profession. There are layers of complexity in the practice of nursing informatics, so designing what concepts are important to baccalaureate nurses for entry level practice would start by identifying what Knowledge Skills and Abilities (KSA) are appropriate for this level (Elgin, & Bergero, 2015).

Framing how technology can be used to enhance nursing practice starts in Undergraduate (UG) education. As baccalaureate students learn the information literacy skills they need to retrieve and analyze information they are building nursing informatics skills that support the practice of evidence based decision making (McGonigle, Hunter, Sipes, Hebda, 2014). Nurses are increasingly viewed as knowledge workers often serving as brokers of information to patients

as they strive to enhance patient centered care. The future of nursing practice will be significantly influenced by how we chose to master, integrate, or ignore new technology. Thus it becomes vitally important that entry level nurses are able to adapt to technology quickly and integrate new technology into their care delivery seamlessly.

One of the largest barriers to making nursing informatics more visible to baccalaureate students in the curricula relates to the fact there remains no consensus among professional nursing organizations and accreditation bodies around language and competencies. (HIMSS, 2015; AACN, 2008; NLN, 2015; ANA, 2014) The end result is that nursing educators (and thus students) are often left wondering how technology and nursing are clearly related to improved care delivery models. Technology can help nurses manage large streams of data, and apply knowledge to find patterns in the data that can support clinical decision making and improved communication at the point of care. Using emerging disruptive technology to extend communication seamlessly to the healthcare team could improve safety and quality outcomes for patients in all environments.

INTRODUCTION

Wearable technology is an example of *ubiquitous computing*, a term first defined by Weiser (1993), to describe how seamlessly technology remains in the background while functioning in the foreground. Healthcare innovators believe it is simply a matter of time before wearable technology becomes commonplace in healthcare education and practice (Grossman, 2015; Skiba, 2014; Sportsman, 2014). As the future unfolds for the *quantifiable self movement*, where individuals will record and store data about their health and interaction with their environment, wearable technology becomes important to understand as a teaching tool for both nurses and patients (Bottles, 2012; Majmudar, Colucci, & Landman, 2015; Sportsman, 2014).

Google Glass (GG) is a wearable technology device that resembles traditional glasses with the addition of an optic cube above the eye frame; they were released to 10,000 explorers across the globe in April 2013. Users can access the Internet, email, text, make and receive phone calls, and take video and pictures all hands-free using voice commands, head tilts or eye blinks to activate and control the device. There is a mouse pad integrated into the temple frame that can be used to navigate as well. Applying this emerging technology to manage and expand communication or locate information at the point of care is a direct illustration of how infusing nursing informatics into nursing education prepares students for their future role in practice. Physicians were some of the first to adopt this technology into their teaching and practice (Ahier, 2014; Nosta, 2013). Formal nursing research regarding the use of GG has been very limited (Aldaz et al., 2015; Schneidereith, 2015). Nursing has informal research using GG in nursing education and patient engagement (Duke School of Nursing, 2014; Brigham and Women's Hospital, n.d.).

PURPOSE

The purpose of this pilot study was twofold. First, to assess if senior baccalaureate nursing students could use Google Glass (GG) to access information necessary to make decisions at the point of care and complete a hands-free Situation-Background-Assessment-Response (SBAR) communication to a remote Primary Care Provider. The second purpose was evaluate students' perceptions related to their experience using GG.

METHOD

A convenience sample of eleven senior baccalaureate nurses (10% of the total population) was obtained at a small private Midwestern college. Participants completed three short researcher designed videos that taught them how to turn on and fit GG, how to access a

Quick Response (QR) code using GG, and how to complete a phone call hands free using GG. Participants received a brief half page printed hand off report that outlined the high fidelity simulation patient's current status. Individuals then entered the simulation and were instructed to respond as needed to address patient care needs. During the simulation, the participants needed to access and review the current physician orders using the QR codes and to call a primary care provider hands free to complete an SBAR and receive updated orders at the point of care.

The researcher was present in the simulation room to observe and coach participants how to use GG, if needed, to complete the task. The researcher could also view the GG screen using an application designed for a smartphone. Video recordings were used to capture timestamps of successful use of GG and participant's nonverbal language. After the simulation, participants completed nine questions from a researcher designed 4 point Likert style survey, and two open ended narrative questions. The study was approved by the IRB, and all participants consented to participate and were not compensated.

RESULTS

Quantitative Results

The eleven participants were all female, ranged in age from 21-23 years, nine (81%) were Caucasian. Four (37%) participants owned two devices that connected to the internet; five (45%) participants owned three or more devices; one (9%) participant did not respond to this question. Nine (82%) of the 11 participants owned smartphones.

All (100%) of the participants successfully used GG to scan a QR code to access the physician orders at the point of care in simulation. Seven (64%) participants completed the task on the first attempt; two (18%) participants required two attempts; two (18%) participants required three attempts and light coaching from the researcher to successfully scan the QR code.

All (100%) of the participants could complete an SBAR phone call hands free at the point of care during the simulation. Nine (82%) participants completed in the first attempt; one (9%) participant required two attempts; one (9%) participant required four attempts to successfully complete the call.

Table 1- Mean Post Simulation Survey Results all participants (n=11)

Survey Total	3.09
3 Highest Scoring Questions	
I have the information I needed at the point of care to make a decision about care	3.7
GG was easy to use to complete an SBAR phone call hands free	3.6
GG might help improve communication within the healthcare system	3.4
3 Lowest scoring questions	
GG gives me a higher degree of confidence in my practice	2.5
GG helped me to remain intentionally present with my patient	2.5
GG was easy to use to access the internet	3.0

Likert scale: 1=strongly disagree; 2=partially disagree; 3=partially agree; 4=strongly agree

Qualitative Results

Two open ended narrative questions were posed in the survey: what are some of the positive ways you think GG could be used in nursing and what are some of your concerns about using GG in nursing. Two themes emerged from the responses, communication and safety.

Communication

Participant's positive comments that support this theme included, "faster communication between the healthcare team;" "could help with communication;" "speed;" "saves time;" "SBAR call readily available" "fast access to the provider;" and "hands free." Conversely some comments included negative themes regarding communication, "it randomly called the moment I

did not want that to happen;” patients feel I may not be listening;” and “how could GG be less blurry for those with bad eyes.”

Safety

Positive comments focused on improved safety included, “more resources at the nurse’s access, did not have to leave the room to access internet;” “nurse remains with the patient at a critical time;” “very effective information;” “quick access to the physician orders;” Conversely some of the comments that expressed concern for safety when using GG included, “took my focus from the patient slightly;” “very hard to see the doctor’s orders clearly;” “distraction;” “hard to hear;” and “changes focus from patient to technology.”

Participants also had one space on the survey for free text about the experience. Only one participant expressed concern about HIPAA compliance with this technology. Two participants identified cost as a potential issue of concern. Four participants responded “cool.”

DISCUSSION

The current study provided some insight into the nursing student perspective of using GG during a high fidelity simulation. This perspective is lacking in the literature, with most findings addressing how physicians use this type of technology in teaching and practice. All participants were able to successfully use an emerging technology (GG) to access necessary information at the point of care, hands free, while remaining at the bedside during a critical event.

Undergraduate nursing education is the portal to professional practice and advanced practice. The baccalaureate nursing students’ educational technology experience sets the tone for how informatics is valued and implemented in future practice. Interfacing with new technology to reflect on how it can be used to improve care delivery was perceived as positive as indicated by an overall mean of 3 out of 4 for all questions in the survey.

Participants valued that while using GG they were able to access necessary information at the point of care and allowed the participant to remain with the patient while speaking to the provider. It is vitally important that entry level practitioners are able to adapt to technology and the frequent changes to technology. How nurses experience and interact with technology can have a significant impact on patient outcomes. Some participants experienced difficulty seeing the data on the optic screen of GG while some did not hear the provider's voice clearly during a phone call using GG. These experiences may influence the success for participants to use GG to improve safety and communication. They also serve to create dialogues about what works or does not work in application of new technology in practice. If, as a profession, we value evidence to guide decisions, then students need to use technology to find data at the point of care, analyze the data in context to create information that has meaning in context. Finally students will need to use information to apply knowledge and wisdom in real time to make safe decisions.

One needs to consider the critical importance of exposure to emerging technology like GG. Digital natives may embrace technology differently than digital immigrants. Navigating a high fidelity simulation with GG allows students to fully embrace the collisions between clinical imagination and creativity. Reflecting on learning is one of the most powerful ways to integrate new knowledge. In the participant's self-reflections, they documented insight into how this type of technology could be used to improve hands free communication and to access critical information at the point of care. An unintended consequence of this pilot study may be that students create their own 'What if questions' that could stimulate their own interest in future pursuits as a nurse researcher.

Currently GG is no longer on the market, but Google announced it may release the second generation soon (Google, 2015). It does not matter if it is GG or another technology that is used in nursing education to stimulate students and faculty to actively engage in a visible practice of informatics. What matters is that nursing *is* engaged, and thus has data to drive decisions about technology and how it can be used in practice. If students do not learn to find their voice about how technology impacts care, they may not be prepared to collaborate when technology is evaluated and implemented in healthcare. Future nurses might remain silent when technology is introduced and applied in practice.

Some limitations of this pilot study include that a convenience sample was used, which limits the generalizability of the results. The survey used was reviewed by a nursing informatician for reliability. No further testing of the instrument was done. Future research needs to be designed to see how using emerging disruptive technology impacts using technology in practice. In addition, further research studies surrounding how using new technology increases informatics influences competencies of faculty and students. Finally, research is needed how the use of disruptive technology informs curricular decision making.

CONCLUSION

This pilot study demonstrated that with little education, baccalaureate students were able to use emerging disruptive technology (GG) to access critical information at the point of care. In addition, participants were able to complete an SBAR hands free. Participants identified that GG use in high fidelity simulation could improve communication and safety. Nursing faculty should continue to explore how to make informatics more visible and valued within the curriculum to narrow the education practice gap. Creating opportunities for students to engage with new

technology stimulates interest in future applications of technology as it unfolds. Nursing as a profession should not remain silent around the application of technology to their practice.

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